PARAMETER TITLE: Fraction of Hardy Organisms and their Survival of Nominal Sterilization Cycles (N_H/N_0)

VALUE	
UPPER	1×10^{-3}
ACCEPTABLE	See Below
LOWER	1×10^{-4}

APPLICATION	
MISSION	Any Requiring Sterilization
CATEGORY	IV
PLANET	All

PARAMETER DEFINITION: Hardy (heat resistant) organisms as a fraction of the total spore population on spacecraft surfaces. Survival of the hardy organisms is expressed as the ratio of the hardy organisms surviving a nominal sterilization cycle to the initial pre-sterilization total spore population.

APPLICABLE SOURCE: All microbial spore populations located on spacecraft surfaces.

CONSTRAINTS: Hardy organisms comprise a fraction of 1×10^{-3} of the total spore population on spacecraft surfaces. For nominal sterilization cycles, i.e., 35-50 hours at temperatures of 111^{o} - 125^{o}C, the surviving fraction of hardy organisms is 1×10^{-4}. Therefore, in designing or assessing spacecraft sterilization cycles, the logarithmic death-rate model based on the D and Z values provided elsewhere in this specification book should not be used to predict lethality greater than 1×10^{-4} for microbial spore populations on spacecraft surfaces. The model is valid, however, for calculating lethality up to the level of the hardy surviving fraction, which, at 1×10^{-4}, establishes the maximum allowable lethality for the nominal sterilization cycles described above.

REFERENCES:

1. Thermal Resistance of Naturally Occuring Airborne Bacterial Spores. J. R. Puleo, et al., Planetary Quarantine Laboratory, Jet Propulsion Laboratory, Cape Canaveral, Florida, 1978.

2. Statistics of the N_H/N_0 Ratio. Paper presented at the "Hardy" Organisms conference, Ames Research Center, November 1974, by P.D. Stabekis, Exotech Research & Analysis, Inc., Gaithersburg, Maryland.

Planetary Protection Officer _____ Date _____